REMARKS

The non-final Office Action mailed May 30, 2003, has been received and reviewed. Claims 1-31 are pending in the application. Claims 9-31 are withdrawn from consideration. Claims 1-8 have been rejected. As of this Amendment, Applicants have amended Claim 1. As of this Amendment, Claims 1-8 are believed to be in condition for allowance and Applicants respectfully request reconsideration of the application as amended herein.

35 U.S.C. § 103(a) Obviousness Rejections

The Examiner has rejected Claims 1-8 under 35 U.S.C. § 103(a) for obviousness. M.P.E.P. 706.02(j) sets forth the standard for a § 103(a) rejection:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, **the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). (Emphasis added).

Obviousness Rejection Based on U.S. Patent No. 6,091,190 to Chalamala et al.

Claims 1, 3-5 and 8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Chalamala et al. The Examiner asserts that "Chalamala teaches a structure for an electron emission device having a emitter electrode having a Schottky barrier, the emitter being metal layer 118 a metal such as molybdenum (see column 3, lines 5+) and a Schottky passivation layer such as oxides of Ba, Ca, In, Sc, Ti, Ir, Co, Sr, Y, Zr, Ru, Pd, Sn, Lu, Hf, Re, La, Ce, Pr, Nd, Pm, Sm, Eu, Ge, Tb, Dy, Ho, Er, Tm, Yb, Th (see column 2 lines 40+)."

Claim 1 has been amended to emphasize that the emitter structure recited in Claim 1 is formed of *three* layers: an emitter electrode 112, a Schottky metal 114 and a semiconductor layer 116. Chalamala et al. fails to teach or suggest "[a]n electron emission device comprising: *an emitter electrode*; an extractor electrode; and a solid-state field controlled emitter comprising a *Schottky metal layer* and a *semiconductor layer forming a Schottky metal-semiconductor junction* fabricated on the emitter electrode and electrically coupled to

the extractor electrode such that an electric potential placed between the emitter electrode and the extractor electrode results in field emission of electrons from an exposed surface of the semiconductor layer of the Schottky metal-semiconductor barrier" as recited in amended Claim 1, emphasis added.

Rather, Chalamala et al. teaches a *two*-layer emitter structure formed of an electron emitter structure (metal) 118 and a passivation layer 120. [FIG. 1 and Col. 2, Line 58 to Col. 5, Line 17] Chalamala et al. teaches the use of TiO as a dielectric (passivation layer 120) of a *given* work function selected to be lower "than that of the material from which electron emitter structure 118 is made," preferably less than 4.6 eV. [Col. 3, Line 49 to Col. 4, Line 28 and Table 1] Chalamala et al. further teaches a *passive* interface between the emitter structure 118 and the passivation layer 120. Chalamala et al. specifically teaches that the passivation layer 120 oxides "have resistivities that are high enough to prevent electrical shorting between gate electrodes 116." [Col. 4, Lines 25-28] Amended Claim 1 of the present application is directed to an "emitter comprising a *Schottky metal layer and a semiconductor layer*" wherein the semiconductor has a *variable* work function that is dependent on the applied field. The term "Schottky" never appears in Chalamala et al.

Regarding Claim 3, Chalamala et al. does not disclose "a solid-state field controlled emitter having a Schottky metal-semiconductor junction" utilizing "Pt as the Schottky metal" as recited in Claim 3. As noted above, Chalamala et al. fails to disclose a "Schottky metal-semiconductor junction." Rather, Chalamala et al. merely discloses a metal-oxide junction wherein the emitter electrode is preferably "made from molybdenum." [Col. 3, Lines 53-56] Chalamala et al. discloses the use of platinum as an emission enhancing coating. [Col. 1, Lines 22-25] However, Chalamala et al. fails to mention or suggest using platinum with a semiconductor material to form a "Schottky metal-semiconductor junction" as recited in Claim 1 from which Claim 3 depends.

Regarding Claim 4, Chalamala et al. discloses the use of TiO for a passivation layer. As noted above, Chalamala et al. fails to disclose the invention recited in amended Claim 1. Furthermore, Chalamala et al. fails to disclose the use of TiO_2 as a semiconductor in a Schottky metal-semiconductor junction" as recited in Claim 4.

Regarding Claims 5 and 8, Chalamala et al. appears to disclose a dielectric between the emitter and extracting electrodes and the use of tip based geometry. However, as noted above, Chalamala et al. fails to disclose the invention recited in amended Claim 1.

For the above reasons and amendments, Claims 1, 3-5 and 8 are believed to be nonobvious over Chalamala et al. Applicants respectfully request reconsideration of the obviousness rejection for these reasons.

Obviousness Rejection Based on U.S. Patent No. 6,091,190 to Chalamala et al. in view of U.S. Patent No. 4,663,559 to Christensen

Claims 2, 6 and 7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Chalamala et al. in view of Christensen. As Claims 2, 6 and 7 depend from amended Claim 1, they too are believed to be allowable over the asserted combination of Chalamala et al. in view of Christensen. For these reasons, Applicants respectfully request reconsideration of the obviousness rejection of Claims 2, 6 and 7.

ENTRY OF AMENDMENTS

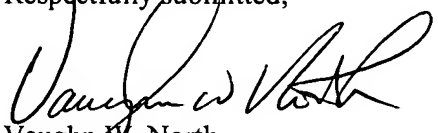
The amendments to Claim 1 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add any new matter to the application.

CONCLUSION

Claims 1-8 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicants' undersigned attorney or Paul C. Oestreich at the same number.

The Commissioner is hereby authorized to charge any additional fee or to credit any overpayment in connection with this Amendment to Deposit Account No. 08-2025.

Respectfully submitted,



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